

**Amendment to the Specification**

Please replace paragraph [0007] with the following.

[0007] This object is achieved with a steering column for a motor vehicle with adjustment means which can be triggered in the case of an accident to move at least a steering wheel end region of the steering column away from a passenger, characterized in that the adjustment means (3) include load absorbing means (7) to absorb a movement of at least the steering wheel end region (2) of the steering wheel (1) away from a passenger. Also, this object is achieved with a steering column for a motor vehicle with adjustment means which can be triggered in the case of an accident to move at least a steering wheel end region of the steering column away from a passenger, characterized in that the adjustment means (3) are designed for at least two operation modes and that a control (5) is provided to sense passenger's parameters by means of detection means (6) and to trigger one operation mode of the adjustment means (3) in dependence on the passenger's parameter. Also, this object is achieved with ~~{and}~~ an adjustment method for a steering column of a vehicle wherein in the case of an accident at least one steering wheel end region of the steering column is moved away from a passenger by means of adjustment means, characterized in that passenger's parameters are recorded by means of detection means (6), and in that the movement of at least the steering wheel end region (2) of the steering column (1) away from the passenger takes place in dependence on the passenger's parameters according to one operation mode out of several operation modes of the adjustment means (3). See ~~Figs~~ Fig. 2 of drawing.

Please replace paragraph [0009] with the following.

[0009] Still further, the safety steering column system according to the above may have the adjustment mechanism including an energy generator for the operator. The energy generator ~~can~~ can be one of a pyrotechnic gas generator and an electrical device. Also, a pair of lockable load absorbers are provided, capable of being operated individually or simultaneously. The load

absorbers can have different absorbencies. The load absorber can include a deformation member. The deformation member can be comprised of one of a cutting knife, material deforming bolts, and a deceleration carriage having at least two deceleration force steps.

Please replace paragraph [0010] with the following.

**[0010]** Still further, the safety steering column system according to ~~according to~~ the above can have sensors sense and provide outputs to the controller of the driver's seat position, seat belt fastened status, driver's size, and at least one of driver's weight and driver's posture. Also, the controller can trigger the operator in dependence on the driver's seat position. The controller can be responsive to a sensed output that is indicative of a predetermined distance or less between the driver and the steering wheel to condition the adjustment mechanism to trigger in case of an accident. Also, the controller conditions the load absorber responsive to the output of the sensor for one of the driver's seat belt fastening status and seat position. Also, the controller can condition the adjustment mechanism in the case of an accident by unlocking the load absorber responsive to the driver not wearing the seat belt.

Please replace paragraph [0012] with the following.

**[0012]** The invention further contemplates a safety steering column system for a motor vehicle that can be selectively configured upon entry into the motor vehicle of a driver in the event of an accident to control the movement of at least a steering wheel end region of the steering column away from the driver of the vehicle correlated to a driver's configuring parameters comprising,

- (a) a steering column comprised of an upper and a lower telescoping ~~parts~~ part with the upper part including the steering wheel end region, with the telescoping parts of the steering column being mounted for telescoping toward the front of the vehicle,
- (b) an adjustment mechanism intercoupling the telescoping parts of the steering column,
- (c) a first sensing device for sensing a physical parameter related to the size of the driver when the driver has entered the motor vehicle and providing a first configuring

- output,
- (d) a second sensing device for sensing a seat belt parameter of whether the driver who is seated in the motor vehicle has a seat belt fastened and providing a second configuring output,
  - (e) the adjustment mechanism including
    - (i) a pair of load absorbers having different load absorbency,
    - (ii) a lock associated with each load absorber,
    - (iii) a triggerable unlocking device associated with each lock that when triggered unlocks the associated lock, and
    - (iv) at least one operator including a triggerable device to generate energy for the operator so that when the device is triggered and energy is generated to drive the operator, the operator will positively move the telescoping parts of the steering column together away from the driver, and
  - (f) a controller for receiving the outputs from the sensing devices and responsive to the received outputs for configuring the adjustment mechanism, when the driver enters the motor vehicle and prior to any accident, by controlling the triggerable unlocking device and the triggerable operator so that the adjustment mechanism operates to operate according to one of at least three preselected different and distinct operations.

Please replace paragraph [0023] with the following.

**[0023]** Furthermore, it is preferred that the detection means ~~include~~ includes: a position detection means of the seat for the passenger[[],]; a status detection means of the seat belt buckle for the passenger's seat belt[[],]; a size, weight and/or posture detection means regarding to the passenger. Therewith the position detection means of the seat for the passenger can include, ~~especially~~ at least one electrical or optical switch within or in connection with seat guiding rails, ~~and/or the.~~ The status detection means of the seat belt buckle for the passenger's seat belt can include at least one electrical or optical buckle usage switch.

Please replace paragraph [0032] with the following.

**[0032]** FIGS. ~~Fig. 3a, 3b and 3c~~ schematically ~~show~~ shows the adjustment means of the first embodiment example of the steering column of FIG. 1 in a view from below (left half of FIG. 3a) and from above (right half of FIG. 3a) and corresponding cross sections, respectively,

Please add the following paragraph.

**[0032.1]** Fig. 3b depicts a sectional view of the left half of Fig. 3a.

Please add the following paragraph.

**[0032.2]** Fig. 3c depicts a sectional view of the right half of Fig. 3a.

Please replace paragraph [0036] with the following.

**[0036]** FIGS. ~~Fig. 9 to 11~~ schematically ~~show~~ shows the adjustment means of a third embodiment example of the steering column in a partially sectioned plan view and two cross sections, respectively,

Please add the following paragraph.

**[0036.1]** Fig. 10 depicts section “10-10” of Fig 9.

Please add the following paragraph.

**[0036.2]** Fig. 11 depicts section “11-11” of Fig 9.

Please replace paragraph [0050] with the following;

**[0050]** The adjustment means 3 comprise load absorbing means 7 with a first and a second load absorber or restrictor 8 (A) or 9 (B) which each include an individual bolt 10 or 11 and a common load absorbing metal sheet 12 forming deformation means (D). By means of the bolts 10 and 11 the load absorbing metal sheet 12 is connected to a sled or carriage 13. The load

absorbing metal sheet 12 is fixedly or permanently connected to a telescopic part (not shown) of the steering column 1 and the sled 13 is fixedly or permanently connected to another telescopic part (not shown) of the steering column 1. If the telescopic part (not shown) of the steering column 1 including the steering wheel end region 2 is loaded or pressed by a passenger (not illustrated) hitting the steering wheel (not marked), so it will be pushed in or over the other telescopic part. This movement is absorbed or damped by the load absorbing means 7 as the load absorbing metal sheet 12 ~~has to be~~ is deformed upon itself and/or the load absorbing metal sheet is deformed against the bolts 10 and 11.

Please replace paragraph [0051] with the following.

**[0051]** The bolts 10 and 11 have each an explosive charge S which can be electrically ignited each independently from each other by the control 5, which, for example, is connected to or integrated in a main or total control (not shown) for an air bag to make any of the bolts 10 and 11 correspondingly ineffective. Status detection means ~~43~~ 63 of a seat belt buckle 14 are connected to the control 5 as detection means 6 in the form of a seat belt or buckle usage switch 15. This seat belt usage switch 15 results in a seat belt usage signal if the passenger has correctly fastened his seat belt (not shown). If the seat belt usage signal is not generated, the control will be informed that the passenger has not correctly fastened his seat belt.

Please replace paragraph [0059] with the following.

**[0059]** On the right hand side of FIG. 3a the load absorber 8 (A) and the load absorber 9 (B) are individually shown in mounting position. The load absorbers 8 and 9 are provided with the bolts 10 or 11 on the carriage 13 on the one hand and on the other hand on the carriage mount 24 with ~~screws~~ screws 25. The slidable telescopic part (not shown) of the steering column 1 is fixedly mounted in the recess L.

Please replace paragraph [0061] with the following.

**[0061]** Fig. 5 shows the load absorbing metal sheet 12 which is a stamping, ~~in the upper part before, i.e.~~ A first section "A" of Fig. 5 depicts the metal sheet 12 in a condition ready for mounting, and in the lower part. A second section "B" of Fig 5 depicts the metal sheet 12 in a condition after an actuation of both load absorbers 8 and 9.

Please replace paragraph [0062] with the following.

**[0062]** As an additional special feature of the invention the load restrictor 8 (A) is designed in such a way that it tears at tearing seams 26 by means of the bolt ~~49~~ 10 immediately upon a load excess. Therewith the end of the load restrictor 8 (A) necessarily shifts or moves over the load restrictor 9 (B) the bolt 11 of which moves in a slot 27 of the load restrictor 9 (B) at the moment. This design leads in an advantageous way to the fact that the tearing forces of both load absorbers 8 (A) and 9 (B) are added. If they tore in parallel side by side, only one of the both load absorbers A or B would work.

Please replace paragraph [0067] with the following.

**[0067]** FIGS. 6 to 8 show a steering column outer pipe 28 and a steering column inner pipe 29 which make up the telescopic parts of the steering column 1 wherein the steering column inner pipe 29 includes the steering wheel end region 2 of the steering column 1. An outer pipe ring piston 30 is mounted to the steering column outer pipe 28, for example by a clinching connection 31. The outer pipe ring piston 30 includes a pyrotechnic cartridge 32 which is connected to the control 5 (compare FIG. 2) via control cables K. An inner pipe ring piston 33 is also fixedly or permanently connected to the steering column inner pipe 29 by a clinching connection 34. In the second embodiment example, this inner pipe ring piston 33 includes one or more correspondingly formed cutting knives 36 mounted in slots 35 as part of the deformation means ~~6~~ 64. The cutters or cutting knives 36 are mounted on a "tilt or break over point" 37 in such a way that they cut well-aimed into the wall 38 of the steering column outer pipe 28 of the steering

column 1 upon drive via the inner pipe ring piston 33. The cutting depth 39 of the chip 40 is defined by a correspondingly formed stop 41. The size of the chip 40 is proportional to the desired load absorbency. The deformation means 6 64 form load absorbencies 42.

Please replace paragraph [0069] with the following.

[0069] Fig. 8 shows a corresponding load absorbency 45 42 in operation. ~~The load absorbency~~  
42

Please deleted paragraph [0071].

Please replace paragraph [0072] with the following.

[0072] In summary, the embodiment example of the present invention illustrated in FIGS. 6 to 8 can be explained as follows: Steering column pipes that can be telescoped are provided with "ring pistons" which shorten the steering column by means of a pyrotechnic pressure set-up or building in between in the case of small drivers and therewith bring an inflating air bag to a larger distance. In one of the ring pistons a load absorbing mechanism is integrated which becomes effective in the case of tall drivers instead of the steering column shortening and is taken out of service by means of pyrotechnic pressure in the case of small drivers. The second ring piston is provided with a load absorbing mechanism. The shown example deals with correspondingly formed and mounted inclineable cutters or knives. Herein corrugated tubes, material deforming balls or the like (not shown in the figures) may be also used. Basically, the function of the load absorbing ring piston is in such a way that the piston automatically absorbs or reduces load if the inner steering column pipe is moved relatively to the outer one. In the shown case, the cutter is machiningly or chip-detachingly pressed in the outer steering column pipe. Alternatively, this load absorbency can be "skipped" in the case of a pyrotechnic ignition with corresponding power or the "cutter" is inclined out of service by a pressure treated control pin according to the ~~example~~ examples shown in the respective figures.

Please replace paragraph [0073] with the following.

**[0073]** In the steering column of a motor vehicle the inner and outer steering column pipe is designed, for example, with a difference in diameter as large as possible. As it is common today amongst other things, the outer steering column pipe is positioned in bearings (not shown in the figures). The inner steering column pipe is connected to the outer one form-fittingly via e.g. grooves or general form with corresponding ring pistons (~~grooves/form~~). The ring piston pair is connected, for example, by clinching with an outer and an inner pipe each. A ring piston includes a pyrotechnic charge the pressure of which pushes the ring pistons away from each other and therewith shortens the steering column or is able to pull the steering wheel in driving direction to the front away from the passenger.

Please replace paragraph [0077] with the following.

**[0077]** However, essentially more critical "load cases" can be taken into consideration than in the embodiment examples explained above, in which it makes sense to pull the steering column away or employ different load absorbing amounts, respectively.

Please replace paragraph [0078] with the following.

**[0078]** In the scope of the embodiment example according to FIGS. 9, 10, and 11, the invention provides such a sled or carriage which is equipped with two special especially differently strong driving cylinders arranged in parallel. Each cylinder is equipped with different pyrotechnic cartridges ignitable by a control apparatus for the active movement. Upon ignition its exploding charge puts pressure onto the corresponding piston thereof and abruptly moves the steering column sled or carriage with the steering column fixed thereto to the front.



Please replace paragraph [0080] with the following.

**[0080]** As there are differently strong pyrotechnic charges in both cylinders, three differently strong movements of the steering column downwards result therefrom in the embodiment example according to FIGS. 9, 10 and 11. Both charges in parallel make, e. g., sense for a small 5% woman (i.e., that only about 5% of all woman are smaller) not wearing a seat belt to gain a large distance to the exploding air bag as fast as possible because of the risk of death in the case of a too close air bag. A larger one of the two charges possibly makes sense for a small woman wearing a seat belt. The "closer" air bag has a better protective effect. The single small charge possibly makes sense for the 50% man (i.e., an average tall man; about 50% of all men are taller and about 50% of all men are smaller) not wearing a seat belt.

Please replace paragraph [0082] with the following.

**[0082]** If the larger load absorber is unlocked and only the smaller one is made to act, this will possibly make sense for a medium tall 50% man wearing a seat belt. Furthermore, the bigger load absorber alone seems to make sense for a tall 95% man (i.e., 95% of all men are smaller or differently spoken, only 5% of all men are taller) wearing a seat belt.

Please replace paragraph [0087] with the following.

**[0087]** An inventive further development lies in the design of the pistons. The pistons have a reverse lock. In the load cases mentioned above, at first in which the steering column is shot to the front, the load absorbers are unlocked and in an unutilized state leave over a part of their lengths, ~~the sled guiding casing~~. In the final phase of an accident the pointed wall or dash panel possibly moves in the direction of the steering. The pistons with reverse lock prevent a pushing back of the steering to the back. In this case the load absorbers are crushed or bent away outside of the sled casing ~~without reference to the accident event~~.

Please replace paragraph [0089] with the following.

**[0089]** The sled or carriage 13 in ~~FIG.~~ FIGS. 9 to 11 is coupled to a telescopic steering column (not shown) in such a way that its shifting results in a contraction of the telescopic parts of the steering column. The shifting of the sled or carriage 13 can be actively operated either by triggering at least one of the two pyrotechnic driving charges 47 and 48 wherein then each of the corresponding bolts 10 and/or 11 is suitably unlocked, for example, by charges S' or S'' or by an external force action of a person (not shown) hitting the associated steering wheel wherein then the bolts 10' and/or 11 as described above are unlocked in such a way that one or both of the load absorbers 8 (A) and 9 (B) act which are differently designed.

Please replace paragraph [0090] with the following.

**[0090]** The pyrotechnic driving charges 47 and 48 have different strengths so that three different driving versions of the sled or carriage 13 of the adjustment means 3 can be operated by the control 5:

1. lesser driving of the sled 13 by triggering only the small charge strength pyrotechnic driving charge or cartridge 47,
2. medium driving of the sled 13 by triggering only the larger charge strength pyrotechnic driving charge or cartridge 48, and
3. higher driving of the sled 13 by triggering both pyrotechnic driving charges or cartridges 47 and 48.

Please replace paragraph [0092] with the following.

**[0092]** By combination of triggering at least of one of the two pyrotechnic driving charges or cartridges 47 and 48 with locked load absorbers 8 (A) and 9 (B), further fine ~~tunes~~ tuning of the adjustment means 3 can be achieved without much further efforts.

Please replace paragraph [0094] with the following.

**[0094]** Furthermore, in FIG. 9 section lines  $\Psi$  “10-10” and  $Z$  “11-11” are drawn along of which FIGS. 10 and 11, respectively, are to be understood. In FIGS. 10 and 11 the sled or carriage 13 itself and the sled support 24 are well visible which can be shifted against each other and one part of which is fixedly connected with a relatively to the vehicle fixed telescopic part (not shown) of the telescopic steering column (not shown) and the other part of which is fixedly connected with a shiftable telescopic part (not shown) of the telescopic steering column (not shown). The relatively to the vehicle fixed telescopic part (not shown) of the telescopic steering wheel (not shown) is fixedly mounted in the recess L.

Please replace paragraph [0095] with the following:

**[0095]** In FIG. 12 the steering column 1 with a steering wheel 54 on its steering wheel end region 2 as well as the seat 4 and the control 5 are shown. The steering wheel 54 and correspondingly that telescopic part (not marked) which forms the steering wheel end region 2 and which can be shifted against the other lower telescopic part 55 of the telescopic steering column 1 is drawn in two positions which correspond to the operation modes which are illustrated in FIGS. 13 and 14. For a 5% woman not wearing a seat belt or unbelted, the two bolts 10 and 11 are unlocked by the ignition of the charges S to decouple sheet 12 and sled 13 so that none of the two load absorbers 8 and 9 act, and both pyrotechnic driving charges 47 and 48 are triggered so that the steering wheel 54 is pulled away from the female passenger as fast and far as possible. This corresponds to the illustration in FIG. 13 and in FIG. 12 of the steering wheel position in which the steering wheel 54 is further away from the seat 4 (i.e., is located further left in FIG. 12). The situation for a 95% man not wearing a seat belt (unbelted) is illustrated in FIG. 14 and in FIG. 12 with the steering wheel position in which the steering wheel 54 is closer to the seat 4 (i.e., is located further right in FIG. 12). In this case, none of the two pyrotechnic driving charges 47 and 48 is

triggered so that the steering wheel 1 is not actively moved away from the driver and both load absorbers 8 and 9 remain effective by not unlocking the bolts 10 and 11 to provide a maximum load absorbency when the driver or his head is hitting the steering wheel 1. In FIG. 12, different distances of the seat 4 to the lower telescopic part 55 of the steering column in the cases of the 5% woman not wearing a seat belt and the 95% man not wearing a seat belt are not taken into consideration.

Please replace paragraph [0117] with the following.

[0117] The new regulation FMVSS Federal Motor Vehicle Safety Standards ("FMVSS") 208 and other further crash test types demand improved values for passengers and especially drivers wearing and not wearing a seat belt. In particular, for small women/woman drivers a sufficient distance has to be provided upon the triggering of the air bag to avoid the neck being broken by a triggered air bag. 25% of all cars registered in the USA after 9/2002 have to meet the new regulations, especially according to the regulation FMVSS 208. In Europe, this will be required for reasons of competition also by then.

Please replace paragraph [0120] with the following.

[0120] In connection, for example, with an air bag system relating to the present applicant/owner, in which a mechanism independent of the air bag pressure opens a lid covering the air bag as long as it has not been triggered that the air bag can "softly" deploy, it is possible that, e.g., only a potentiometer, for example, in a driver seat rail is sufficient for the detection of the driver's size (~~see illustration active air bag lid~~).

Please replace paragraph [0125] with the following.

[0125] In summary, the present invention makes possible amongst other things individually or in combination a safety steering column and the operation thereof wherein in the case of a crash an adaptation to three requirements is possible:

1. The steering column "reacts" to the concrete passenger's situation.
2. The steering column covers the complete range of 5% woman to 95% man wearing or not wearing a seat belt.
3. Smaller people have more distance to an air bag, or differently spoken, a larger air bag employment space exists for a 5% woman.
4. With tall people not wearing a seat belt, a large load peak reduction takes place or, differently spoken, an excessive load for a 95% man is absorbed.